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[TXD 4: Wool and Wool Products]

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( पहला पुनरीक्षण )

Indian Standard

# TEXTILES — HAND-KNITTING WOOL YARN, WORSTED — SPECIFICATION

*( First Revision )*

UDC 677·313·072·32

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

*December* 1993

**Price Group 2**

Wool and Wool Products Sectional Committee, TX 04

## FOREWORD

This Indian Standard ( First Revision ) was adopted by the Bureau of Indian Standards, after the draft finalized by the Wool and Wool Products Sectional Committee had been approved by the Textile Division Council.

The standard first published in 1975 has been revised to:

a) amend the requirement of mothproofing, and

b) incorporate the requirement of staining of adjacent fabric in case of colour fastness to washing and perspiration.

Hand-knitting wool yarn is generally a plied worsted yarn used for making hand-knitted garments. The yarn may be spun from wool fibres alone or from blends of wool with man-made fibres like polyamide, polyester or acrylic.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values ( *revised* )'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

# *Indian Standard*

# TEXTILES — HAND-KNITTING WOOL YARN, WORSTED — SPECIFICATION

## *( First Revision )*

## 1 SCOPE

**1.1** This standard prescribes the requirements of hand-knitting wool yarn spun on worsted system from wool fibres or blends of wool with man-made fibres.

**1.2** This standard does not cover general appearance, colour and type of finish ( *see also* **5.4** ).

## 2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

## 3 TERMINOLOGY

**3.1** For the purpose of this standard, the definitions given in IS 3596 : 1967 and the following shall apply.

### 3.2 Twist Factor

A number which when multiplied by the square root of yarn count in tex gives the number of turns per centimeter. For yarns spun on worsted system, the relationship between twist factor and twist multiplier ( corresponding to twist factor in direct system of yarn numbering ) is as under:

Twist factor = 12 × twist multiplier

## 4 MANUFACTURE

**4.1** The wool tops used for spinning yarn shall be of at least 48 s grade depending upon the end-use of hand knitting wool yarn. The specification of wool tops processed out of imported indeginous wool shall be as given in IS 5911 : 1977.

**4.2** The hand-knitting wool yarn shall be spun on worsted system. The yarn shall be evenly spun and uniformly twisted.

**4.3** The yarn shall be reasonably free from snarls, slubs, loose ends, odd knots, knots with long tails, stains, burrs, etc.

## 5 REQUIREMENTS

**5.1** The yarn shall conform to the requirements given in Table 1.

### 5.2 Yarn Composition

In case of blended yarn the percentage of various fibres shall be determined by the methods given in IS 1564 : 1988, IS 2005 : 1988, IS 2006 : 1988, IS 2176 : 1988, or IS 3421 : 1988. However, a manufacturing tolerance of 3 percent shall be permitted on wool contents. Before making the quantitative chemical analysis, the fibres present in the yarn should first be identified according to the method prescribed in IS 667 : 1981.

### 5.3 Moth-Proofing

If required by the buyer, the yarn may be rendered moth-proof by suitable chemicals which will not have toxic effect on human body. The manufacturer shall declare the mothproofing chemical used, the minimum residual content and the method of test for determining the same.

**5.3.1** The methods for estimation of common preservatives used in textiles are given in IS 3522 ( Part 3 ) : 1983.

### 5.4 Sealed Sample

If in order to illustrate or specify indeterminable characteristics, such as general appearance, colour and type of finish, a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

**5.4.1** The custody of the sealed sample shall be matter of prior agreement between the buyer and the seller.

## 6 PACKAGING

**6.1** The hand-knitting wool yarn shall be converted into balls of 25 or 50 g or hanks of 50 or 100 g. The hand-knitting wool yarn of the same type, ply, count, colour and dye-lot number and having the same finish shall be packed together.

**6.2** The permissible number of knots shall be one per 25 g of hand-knitting wool yarn.

**6.3** The yarn shall be packed in accordance with the procedure laid down in IS 2518 : 1964 or IS 3353 : 1966.

**Table 1 Requirements of Hand-Knitting Wool Yarn**
( *Clause* 5.1 )

| Sl No.<br>(1) | Characteristic<br>(2) | Requirement<br>(3) | Method of Test<br>(4) |
|---|---|---|---|
| i) | Linear density [ universal count in tex ( *see* Note 1 ) ] | As specified in contract subject to a tolerance of ± 5 percent | IS 681 : 1964 |
| ii) | Balance of twist ( *see* Note 2 ) | No undue tendency to retwist; however a maximum of 8 turns as double or retwist may be permitted | Approximately 1·5 m of yarn is taken out from the conditioned package and is held horizontally in the two hands and the two ends are slowly brought together keeping them about 10 cm away |
| iii) | Tenacity, g/tex, *Min* | 5·0 | A-1 |
| iv) | Mass | As declared or marked | IS 4902 : 1981 |
| v) | Scouring loss, percent, *Max* | 2·0 | A-2 |
| vi) | *p*H value: | | IS 1390 : 1983 |
| | a) All wool yarn | | |
| | 1) Bleached and stoved shades | 4·0 to 7·5 | |
| | 2) Other shades | 6·0 to 7·5 | |
| | b) Blended yarn | 5·0 to 7·5 | |
| vii) | Alkali solubility, percent, *Max*: | | IS 3429 : 1966 |
| | a) Bleached yarn | 25 | |
| | b) Dyed yarn | 20 | |
| viii) | Colour fastness to : | | |
| | a) Light | 4 or better | IS 686 : 1986 or<br>IS 2454 : 1985 |
| | b) Washing | | IS 687 : 1979 |
| | 1) Change in colour | 3 or better | |
| | 2) Staining of adjacent fabric | 3 or better | |
| | c) Perspiration | | IS 971 : 1983 |
| | 1) Change in colour | 3 or better | |
| | 2) Staining of adjacent fabric | 3 or better | |
| | d) Dry-cleaning | 4 or better | IS 4802 : 1986 |

NOTES

1 The common counts of hand-knitting wool yarn are:

80 tex × 4 ( Nm 12·5/4 )
63 tex × 4 ( Nm 16/4 )
59 tex × 4 ( Nm 17/4 )
55 tex × 4 ( Nm 18/4 )
49 tex × 4 ( Nm 20/4 )
42 tex × 4 ( Nm 24/4 )
55 tex × 2 × 4 ( Nm 18/2/4 )

2 Although the twist factor is not specified, however, the first and second folding twist shall be so balanced as to give a straight line appearance to the surface of the yarn, a twist factor of 15 to 25 is likely to give the desired result.

## 7 MARKING

**7.1** Each ball/hank shall be marked with the following:

a) Type of hand-knitting wool yarn, such as crepe or double knit;
b) Count of yarn;
c) Indication of the source of manufacture;
d) Composition and percentage of constituent fibres;
e) Dye-lot number and manufacturer's shade number; and
f) Weight of each ball or hank and number of balls or hanks in the package.

**7.1.1** Each ball, hank, or package may also be marked with Standard Mark.

## 8 SAMPLING

### 8.1 Lot

In any consignment all the hand-knitting wool yarn manufactured from the same grade of wool tops and of the same count delivered to one buyer against a despatch note shall be grouped together to constitute a lot.

**8.2** The conformity of the lot to the requirements of this specification shall be determined on the basis of the tests carried out on the samples selected from it.

**8.3** Unless otherwise agreed to between the buyer and the seller, the number of packages of yarn to be selected at random from a lot shall be as given in Table 2.

**Table 2 Sample Size**

( *Clause* 8.3 )

| Lot Size | Sample Size |
|---|---|
| Up to 300 | 5 |
| 301 to 500 | 8 |
| 501 to 1 000 | 13 |
| 1 000 and above | 20 |

**8.4** The number of samples and criterion for conformity for each characteristic shall be as follows:

| *Characteristic* | *Number of Samples* | *Criterion for Conformity* |
|---|---|---|
| Linear density, balance of twist and tenacity | One ball/hank from each package selected according to **8.3** | Each observed value to satisfy the relevant requirement |
| Mass ( Weight ), scouring loss, *p*H value, alkali solubility, and colour fastness to various agencies except light | 3 balls/hanks up to lot size of 500 packages and 5 for bigger lots | |
| Colour fastness to light | One up to lot size of 500 packages and two for bigger lots | |

## ANNEX A

( *Clause* 2 )

### LIST OF REFERRED INDIAN STANDARDS

| *IS No.* | *Title* |
|---|---|
| 667 : 1981 | Methods for identification of textile fibres ( *first revision* ) |
| 681 : 1964 | Methods for determination of universal count of woollen and worsted yarn |
| 686 : 1985 | Methods for determination of colour fastness of textile materials to daylight ( *first revision* ) |
| 687 : 1979 | Method for determination of colour fastness of textile materials to washing: Test 1 ( *second revision* ) |
| 971 : 1983 | Method for determination of colour fastness of textile materials to perspiration ( *first revision* ) |
| 1390 : 1983 | Methods for determination of *p*H value of aqueous extracts of textile materials ( *first revision* ) |
| 1564 : 1988 | Method for quantitative chemical analysis of binary mixtures of cellulose triacetate and certain other fibres ( *first revision* ) |
| 1670 : 1991 | Textiles — Yarn — Determination of breaking load and elongation at break of single strand ( *second revision* ) |
| 2005 : 1988 | Methods for quantitative chemical analysis of binary mixtures of nylon 6 or nylon 6·6 fibres and certain other fibres ( *first revision* ) |
| 2006 : 1988 | Method for quantitative chemical analysis of binary mixtures of protein fibres and certain other non-protein fibres ( *second revision* ) |
| 2176 : 1988 | Textile — Binary mixtures of cellulose acetate and certain other fibres — Methods for quantitative chemical analysis ( *first revision* ) |
| 2454 : 1985 | Methods for determination of colour fastness of textile materials to artificial light ( xenon lamp ) ( *first revision* ) |
| 2518 : 1964 | Code for seaworthy packaging of wool hosiery yarn and goods |
| 3353 : 1966 | Code for inland packaging of wool hosiery yarn and goods |
| 3421 : 1988 | Textiles — Binary mixtures of acrylic, certain modacrylics and certain other fibres — Methods for quantitative chemical analysis ( *first revision* ) |
| 3429 : 1966 | Method for determination of solubility of wool in alkali |

| *IS No.* | *Title* |
|---|---|
| 3522 (Part 3) : 1983 | Methods for estimation of common preservatives used in textiles |
| 3596 : 1967 | Glossary of terms relating to hosiery |
| 4802 : 1988 | Method for determination of colour fastness of textile materials to dry-cleaning (*first revision*) |
| 4902 : 1981 | Method for determination of correct invoice weight of all wool materials (*first revision*) |
| 5911 : 1977 | Fineness grades of wool tops (*first revision*) |

# ANNEX B

( *Table* 1 )

## METHODS OF TEST

### B-1 METHOD FOR DETERMINATION OF TENACITY

**B-1.1** Determine the breaking strength of yarn by the method given in IS 1670 : 1991 and the average count as given in Table 1.

**B-1.2** Calculate tenacity by using the following formula:

$$\text{Tenacity, g/tex} = \frac{A}{B}$$

where

$A$ = breaking strength in grams; and

$B$ = linear density, that is universal count in tex.

### B-2 METHOD FOR DETERMINATION OF SCOURING LOSS

**B-2.1 Test Specimen**

Take about 10 g of yarn from each sample. This shall constitute the test specimen.

**B-2.2 Procedure**

**B-2.2.1** Dry the test specimen to constant mass in the drying oven at 105 ± 3°C temperature and determine its mass accurately ( *see* Note ).

NOTE — Constant mass shall be deemed to have been reached if the difference between the two successive weighings at an interval of 20 minutes is less than 0·05 percent.

**B-2.2.2** Extract the specimen with a mixture of benzene and methyl alcohol in the proportion of 3:2 in a Soxhlet apparatus for 4 hours at the rate of 5 extractions per hour, by placing the specimen in a thimble and covering it with cotton-wool previously extracted with the above stated mixture of benzene and methyl alcohol in the proportion of 3:2. Distill off the solvent from the extract. Dry the residue to a constant mass ( *see* Note under **B-2.2.1** ) at 105 ± 3°C and determine the mass accurately.

**B-2.3 Calculation**

**B-2.3.1** Calculate the scouring loss by the following formula:

$$\text{Scouring loss, percent} = \frac{100 \times a}{b}$$

where

$a$ = mass of the dry residue ( *see* **B-2.2.2** ), and

$b$ = mass of the test specimen ( *see* **B-2.2.1** ).

**B-2.4** Repeat the test with the remaining test specimens.

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Printed at Paragon Enterprises, Delhi, India